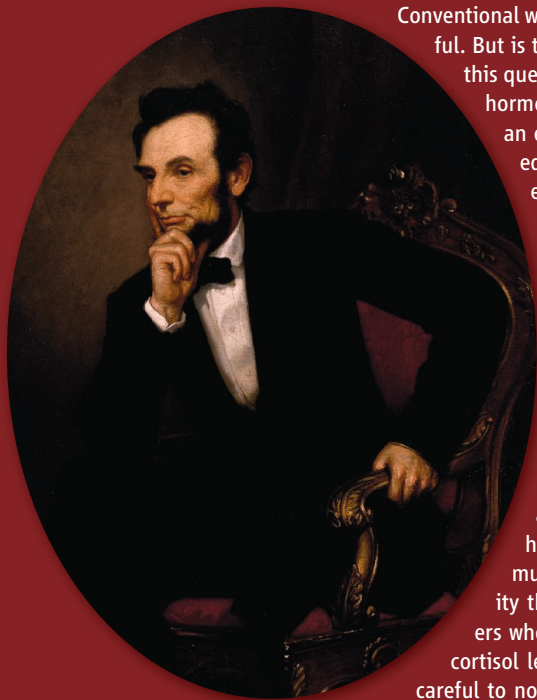


PSYCHOLOGY

Low-Stress Leaders?

Conventional wisdom suggests that being a leader is stressful. But is that actually true? Sherman *et al.* addressed this question by measuring the amount of the stress hormone cortisol in the saliva of participants in an executive education program, which included corporate, government, and industry leaders. They also measured the anxiety levels of participants using surveys. Leaders had lower amounts of cortisol and reported experiencing less anxiety than people not in leadership positions, and individuals further up the chain had less cortisol and anxiety than individuals in lower positions. The authors hypothesized that a greater sense of control by leaders may explain this difference and a second study in which leaders provided information about how many subordinates they had, how many directly reported to them, and how much decision-making autonomy and authority they had relative to the subordinates. Leaders who had more of a sense of control had lower cortisol levels and less anxiety. Sherman *et al.* were careful to note that their study was purely correlational and could not demonstrate which came first—the leadership or the lower levels of markers for stress. — BJ

Proc. Acad. Natl. Sci. U.S.A. **109**, 17903 (2012).



the potential energy landscape is mapped as a three-dimensional surface in which depressions represent stable states or “attractors.” These attractors represent alternative cell fates. With a simplified network analyzed with a Boolean network model, the authors identified key network components that together could force cells to undergo apoptosis rather than proliferation or cell cycle arrest. Experiments verified that modulation of these two components effectively promoted cell death. The approach may provide a way to address complex system-level data and models to more accurately predict ways to steer cells to adopt a desired physiological state. — LBR

Sci. Signal. **5**, ra83 (2012).

CHEMISTRY

A Stable Route to Selectivity

In general, the purpose of catalysis is to speed up reactions that otherwise proceed too slowly. Asymmetric catalysis is something of a special case though: When the catalyst's role is to bias a reaction toward one particular product isomer, problems arise if the background reaction is too fast on its own. This circumstance limited a prospectively promising route to chiral allylic amines. Specifically, decades-old chemistry established that adducts of terminal olefins and imido-sulfur compounds quickly rearrange to form carbon-nitrogen bonds. Bao and Tambar realized that stabilization of such adducts could slow down the bond-forming event sufficiently for a catalyst to dictate stereoselectivity. Benzenesulfonyl sulfurdiumide proved the optimal reagent, affording an adduct so slow to rearrange that

it persisted for days below 0°C. The authors could then introduce a palladium catalyst coordinated by a chiral ligand to coax the adducts toward allylic amine products with enantioselectivities exceeding 90%. The reaction tolerated electrophilic substituents on the olefin framework, such as aldehydes, nitriles, and halides. — JSY

J. Am. Chem. Soc. **134**, 10.1021/ja307851b (2012).

PLANETARY SCIENCE

The Two Faces of the Moon

The nearside and farside of the Moon look very different. The farside, which we cannot see from Earth but has been imaged by satellites, almost completely lacks the large basaltic

GENETICS

Acquiring the Essentials

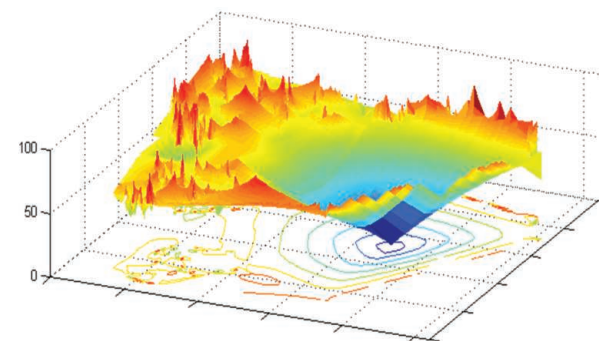
Bdelloid rotifers are microinvertebrates that have garnered much interest because of their long history of asexual reproduction (tens of millions of years), high rates of horizontal gene transfer, and ability to withstand extreme desiccation. Boschetti *et al.* have examined the transcriptome of hydrated and dehydrated *Adineta ricciae* bdelloid rotifers and identified genes that have probably undergone horizontal gene transfer. They found that approximately 9.7% of transcripts appeared to be from genes that have undergone horizontal gene transfer, of which half appeared to be of prokaryotic origin. The remaining half were of eukaryotic origin. These foreign transcripts are probably functional. In fact, 39% of enzymatic activity in bdelloid rotifers may be the result of acquired genes. The presence of genes of prokaryotic origin in their genome allowed bdelloid rotifers to degrade toxic compounds. Thus, the authors conclude that extreme horizontal gene transfer may have increased bdelloid stress tolerance and competitiveness, and might have also facilitated their long-term persistence in the absence of sex. — LMZ

PLoS Genet. **8**, e1003035 (2012).

CELL SIGNALING

Viewing the Cancer Landscape

The cellular signaling pathways that control cell physiology are key targets of therapeutic strategies, like those aimed at killing cancer



cells. But agents that cause DNA damage in cancer cells lead to cell death through a complicated network of pathways, including positive and negative feedback loops, that control the activity of the tumor suppressor p53. To help clarify more effective strategies to promote cell death in cancer cells, Choi *et al.* used a computational approach in which

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plains (mare) that are so prominent on the nearside. A giant impact early in the Moon's history is one of the possible explanations for this asymmetry, which manifests itself not only in mare basalt distribution but also in crustal thickness and concentrations of radioactive elements. Nakamura *et al.* used spectral data from the Japanese Kaguya mission to look for the signatures of such an impact. Specifically, they searched for low-calcium pyroxene, a mineral that can be associated with a large impact, because it would either be excavated from the upper mantle and exposed at the surface or produced by the melting of a mixture of crust and mantle materials after the impact. Concentrations of low-calcium pyroxene were found to occur around the two largest impact basins on the Moon: the South Pole–Aitken basin, on the farside, and the Imbrium basin, on the nearside. The mineral was also found around the Procellarum basin, a 3000-kilometer-diameter basin on the nearside, whose origin has been equivocal. A large impact on the Procellarum region could explain the asymmetry between the two faces of the Moon. — MJC

Nat. Geosci. **5**, 775 (2012).

EDUCATION

Quality Assurance

Measuring teacher quality is a contentious topic; everyone agrees it should be done, but few can agree on how best to do it. Multiple-choice assessments are easy and cost-effective, but are they accurate enough to determine

teacher certification and promotion? Hill *et al.* investigated this question by evaluating 10 elementary and 24 middle-school teachers in the United States on a written math assessment, during their mathematics instruction, and on their students' performance on a state assessment. Although the written math assessment did identify teachers below a minimum competence criterion, it failed to identify all of the weak teachers, suggesting that the written test could be more reliable if expanded to detect the types of difficulties observed during classroom teaching. In contrast, the written test identified most teachers with strong observational scores, suggesting that it could be used as a screen for teacher promotions. Taken together, these results indicate that multiple-choice exams can be predictive of classroom practice. To verify the reliability of these exams, future research should include comparing preservice teachers' scores with their later practice and student outcomes scores. — MM

Am. J. Educ. **118**, 489 (2012).

ECOLOGY

A One-Two Punch

Climate change is expected to shift the ranges of many species as they attempt to follow the thermal envelope to which they are presumably adapted. As the planet warms, this may produce novel communities and interactions between species. This is because species do not exist in isolation but as parts of large communities of interacting species. Milazzo *et al.* now report one such example by studying two closely related species of wrasse (rainbow and ornate) in the Mediterranean Sea. Rather than shift their ranges, they found that the cool-water species of fish shifted to a less-preferred seagrass habitat and reduced its level of activity when the density of the warmer-water species within the same enclosure was high. Interestingly, these shifts were not seen at cooler water temperatures and were only observed at high water temperatures when the ratio of the warm-water to cool-water species was high. Thus, in this particular example, the cooler-water species make these changes only when faced with the dual injury of both warmer water and inter-specific competition. Furthermore, as species individually begin to respond to their changing environments, unexpected interactions and impacts among species are likely to occur. As the climate changes, we should begin to expect the unexpected. — SNV

J. Anim. Ecol. **10.1111/**

j.1365-2656.2012.02034.x (2012).

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